

In the Claims

-- 1 (Previously Presented). A method of estimating a communication path formed of a plurality of channels, associated with a plurality of antennae, the method necessitating an estimate of the impulse response C_1, C_2, \dots, C_n of said channels, comprising the steps of:

- acquiring a space statistic of the communication path,
- establishing a corrected impulse response (C'_1, C'_2, \dots, C'_n) at least by weighting said impulse response estimates (C_1, C_2, \dots, C_n) by means of said space statistic and an estimate of the additive noise ($N_{01}, N_{02}, \dots, N_{0n}$) of said channels.

-- 2 (Previously Presented). A method according to claim 1, wherein said space statistic corresponds to an estimate of the correlation of said communication channels taken two by two.

-- 3 (Previously Presented). A method according to claim 2, wherein said estimate of the correlation of the communication channels takes the form of a space correlation matrix (G) in which the element (g_{ij}) in the i th row and the j th column is obtained by smoothing the product ($C_i^H C_j$) of the Hermitian transposition of the estimated impulse response (C_i) of the i th channel and the estimated impulse response (C_j) of the j th channel.

-- 4 (Previously Presented). A method according to claim 3, wherein if a signal S received by a channel corresponds to a transmitted training sequence the estimate of the additive noise (N_0) of that channel is obtained by normalizing the energy of the vector ($S - AC_1$) where A is the measurement matrix associated with said training sequence.

-- 5 (Previously Presented).
is followed by an averaging step.

A method according to claim 4, wherein said normalization

-- 6 (Previously Presented).

A method according to any of claims 3 to 5, wherein if a noise matrix (N) is formed from the estimated additive noise ($N_{01}, N_{02}, \dots, N_{0n}$) of the channels and a space-weighting matrix (G') is defined on the basis of said spatial correlation matrix (G) and said noise matrix $G' = G(G + N)^{-1}$, said corrected impulse responses (C'_1, C'_2, \dots, C'_n) are obtained from the following expression:

$$\begin{pmatrix} C'_1{}^t \\ C'_2{}^t \\ \cdot \\ \cdot \\ \cdot \\ C'_n{}^t \end{pmatrix} = G' \begin{pmatrix} C_1{}^t \\ C_2{}^t \\ \cdot \\ \cdot \\ \cdot \\ C_n{}^t \end{pmatrix}$$

-- 7 (Currently Amended).

A method according to claim 6 wherein, if the signal (S) received by a channel corresponds to a transmitted training sequence, the method includes the following steps before establishing said corrected impulse response (C'_1) of that channel:

- acquiring a time statistic of the transmission channel,
- establishing the estimate (X_p) of the impulse response (C_1) of said channel, in which the estimate (X_p) is weighted by said time statistic of the channel by means of said received signal (S).

-- 8 (Previously Presented). A method according to claim 7, wherein said time statistic corresponds to an estimate of the covariance of said impulse response.

-- 9 (Currently Amended). A method according to claim 8, comprising the steps of:

- smoothing said impulse response and orthonormalizing by means of a transformation matrix W to obtain said estimate of the covariance which then takes the form of a matrix L',
- seeking eigenvectors (v_i') and eigenvalues (λ_i') associated with that matrix L',
- estimating the an instantaneous impulse response of the channel from said received signal (S) and applying that transformation matrix W to form a vector X', so establishing said weighted estimate (Xp):

$$X_p = \sum \left(\frac{\lambda_i' - N_0}{\lambda_i'} (v_i'^h \cdot X') \right) W v_i'^h$$

where N_0 is a positive real number representing the additive noise of said channel.

-- 10 (Previously Presented). A method according to claim 9, wherein said additive noise (N_0) is made equal to the smallest of said eigenvalues (λ_i').

-- 11 (Previously Presented). A method according to claim 9 wherein each eigenvalue of a subset of said eigenvalues (λ_i') having a contribution less than a predetermined threshold is forced to the value of said additive noise (N_0).

-- 12 (Previously Presented). A method according to claim 8, wherein said estimate of the covariance takes the form of a matrix R and said weighted estimate (Xp) is established as

follows:

$$X_p = (A^t A + N_0 R^{-1})^{-1} A^t S$$

where A is the measurement matrix associated with said training sequence and N_0 is a positive real number representing the additive noise of said channel.

-- 13 (Currently Amended). A method according to claim 12, comprising a step of orthonormalizing said matrix R by means of a transformation matrix W to obtain a new matrix R', the weighted estimate then taking the following new form:

$$X_p = W^t (I + N_0 R'^{-1})^{-1} W^t A'^t S$$

where the matrix A' is equal to product of the transformation matrix W and said measurement matrix A and I represents the identity matrix.

-- 14 (Previously Presented). A method according to claim 13, wherein the expression $(I + N_0 R'^{-1})^{-1}$ is calculated by means of the matrix inversion lemma.